



# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P60172PCT	<b>FOR FURTHER ACTION</b>  See Form PCT/PEA/416	
International application No. PCT/EP2004/002702	International filing date ( <i>day/month/year</i> ) 16.03.2004	Priority date ( <i>day/month/year</i> ) 25.03.2003
International Patent Classification (IPC) or national classification and IPC C23F1/18		
Applicant ATOTECH DEUTSCHLAND GMBH ET AL.		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p style="margin-left: 20px;">a. <input checked="" type="checkbox"/> <i>sent to the applicant and to the International Bureau</i>) a total of 2 sheets, as follows:</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p style="margin-left: 20px;">b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>		
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I      Basis of the opinion</p> <p><input checked="" type="checkbox"/> Box No. II     Priority</p> <p><input type="checkbox"/> Box No. III    Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV    Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V     Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI    Certain documents cited</p> <p><input type="checkbox"/> Box No. VII   Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII   Certain observations on the international application</p>		
Date of submission of the demand  25.10.2004	Date of completion of this report  29.07.2005	
Name and mailing address of the international preliminary examining authority:   <div style="margin-left: 20px;"> European Patent Office - P.B. 5818 Patentlaan 2  NL-2280 HV Rijswijk - Pays Bas  Tel. +31 70 340 - 2040 Tx: 31 651 epo nl  Fax: +31 70 340 - 3016 </div>	Authorized Officer  Handrea-Haller, M  Telephone No. +31 70 340-4823  	

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/EP2004/002702

**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
    - ☐ international search (under Rules 12.3 and 23.1(b))
    - ☐ publication of the international application (under Rule 12.4)
    - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

**Description, Pages**

1-20 as originally filed

**Claims, Numbers**

2-19 as originally filed

1 received on 29.06.2005 with letter of 29.06.2005

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
  - ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing *(specify):*
  - ☐ any table(s) related to sequence listing *(specify):*
4. ☒ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
  - ☐ the description, pages
  - ☒ the claims, Nos. 1
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing *(specify):*
  - ☐ any table(s) related to sequence listing *(specify):*

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/EP2004/002702

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**Box No. II Priority**

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1. ☒ This report has been established as if no priority had been claimed due to the failure to furnish within the prescribed time limit the requested:  
☒ copy of the earlier application whose priority has been claimed (Rule 66.7(a)).  
☐ translation of the earlier application whose priority has been claimed (Rule 66.7(b)).
2. ☐ This report has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rule 64.1). Thus for the purposes of this report, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	2-5,7,11,15,16,18
	No: Claims	1,6,8-10,12-14,17,19
Inventive step (IS)	Yes: Claims	
	No: Claims	1-19
Industrial applicability (IA)	Yes: Claims	1-19
	No: Claims	

2. Citations and explanations (Rule 70.7):

**see separate sheet**

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**Box No. VIII Certain observations on the international application**

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The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**Re Item I**

**Basis of the report**

- 1 The amendment filed with the telefax dated 29.06.2005 introduces subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2)(b) PCT. The amendment concerned is the following: " the concentration of sulfate ions in the solution is that concentration which is achieved when sulfate ions are precipitated as barium sulfate" inserted in independent claim 1.
- 2 Furthermore, according to the new amended claim 1 the etching solutions of the invention can contain a undefined concentration of sulfate ions, which are precipitated as barium sulfate.
- 3 Moreover, this amendment is unclear and leaves the reader in doubt as to the meaning of the technical features to which it refers, thereby rendering the definition of the subject-matter of said claim unclear (Article 6 PCT).

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

- 1 The following documents are referred in this communication:  
  
D1: FR-A-2 392 100 (ALFACHIMICI SPA) 22 December 1978 (1978-12-22)  
  
D2: GB-A-1 546 524 (SHIPLEY CO) 23 May 1979 (1979-05-23)  
  
D3: US-A-6 036 758 (FAIRWEATHER WILLIAM A) 14 March 2000 (2000-03-14)  
  
D4: DE 21 49 196 A (TOKAI ELECTRO CHEMICAL CO) 2 November 1972 (1972-11-02)

D5: EP-A-1 167 585 (EBARA CORP) 2 January 2002 (2002-01-02)

## **2 NOVELTY**

2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1, 6, 8-10, 12-14, 17 and 19 is not new in the sense of Article 33(2) PCT.

2.2 The document D1 (the references in parentheses applying to this document) discloses the process and a solution for etching copper. The solution contains 200 g/l  $\text{H}_3\text{PO}_4$ , 40 g/l  $\text{H}_2\text{O}_2$  and 20 g/l of a phenol derivate, which is phenol sulfonic acid according to page 3, line 24 (cf. example 1). The treatment is particularly suited for improving the adherence between copper and subsequently applied metal coating (e.g. copper coatings). Since commercial phenol sulfonic acid contains less than 2 % sulfate ions (see Scientific Research 2003/2004 submitted with your letter of 22. 10.2004), the concentration of 20 g/l of this acid results in a concentration of less than 0.04 g/l sulfate ions. According to previous claim 1, the etching solutions of the invention can contain more sulfate ions, because the concentration of sulfate producing substances is unlimited and according to claim 6 is up to 250 g/l, which corresponds with 0.5 g/l sulfate. Moreover, the origin of the sulfate is irrelevant to the invention (cf. page 8, line 9-10).

Thus, the subject-matter of claims 1, 6, 8-10, 12-14, 17 and 19 is not novel.

2.2 The document D2 (the references in parentheses applying to this document) discloses the process and a solution for etching copper. The solution contains 100-300 ml/l concentrated HCl, 30 g/l  $\text{H}_2\text{O}_2$  and 20 g/l of phenol sulfonic acid (cf. claims 1-6, 14 and examples 26-28).

For the same reason as in the above point 2.1, claims 1, 6, 8-10 and 12 lack novelty with regard to this document.

### **3 INVENTIVE STEP**

- 3.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 2-5, 7, 11, 15, 16 and 18 does not involve an inventive step in the sense of Article 33(3) PCT.
- 3.2 Dependent claims 2-5 and 7 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step, since these features are well known in the field (see documents D3, examples and D4, claims 1-5).
- 3.3 The addition of polyethylene glycol or polypropylene glycol to etching solutions in order to achieve a smoother polishing is also common knowledge in the art (see document D5, column 6, line 50, to column 7, line 21).
- 3.4 The feature of claim 15 is a common feature in the field and can thus not render any claim to which it refers inventive.
- 3.5 No effect at all is shown of the features of claims 16 and 18; there is thus no basis in the application for assessing inventive step for these claims

### **4 INDUSTRIAL APPLICABILITY**

- 4.1 The invention shall be considered as susceptible of industrial application because it can be used in the metal cleaning industry.

#### **Re Item VIII**

#### **Certain observations on the international application**

- 1 The term "on the order of" used in claim 1 is vague and unclear and leaves the reader in doubt as to the meaning of the technical feature to which it refers, thereby rendering

the definition of the subject-matter of said claim unclear, Article 6 PCT. This term should be deleted.

- 2 The term "about" used in claims 3 and 6 introduces ambiguity with respect to the limits of the range it refers to, and as such renders the scope of these claims unclear, Article 6 PCT; accordingly, the claims require amendment to remove this defect by deleting this term.

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JC09 Rec'd PCT/PTO 23 SEP 2005

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Atotech Deutschland GmbH  
29 June 2005

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## 5 Claim 1

1. A solution for etching copper or a copper alloy, said solution having a pH on the order of 4 or less, comprising:

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- a) at least one oxidizing agent selected from the group comprising hydrogen peroxide and peracids and  
b) at least one substance selected from the group comprising aromatic sulfonic acids and salts of the aromatic sulfonic acids

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characterized in that the concentration of sulfate ions in the solution is that concentration which is achieved when sulfate ions are precipitated as barium sulfate.